# Explorations in Data Analytics, MAT 343-01 Spring 2022

# TR 11:00 a.m. – 12:15 p.m. Science 238

*Instructor*: Dr. Marsha Davis

*Office*: Science 152 *E-mail*: [davisma@easternct.edu](mailto:davisma@easternct.edu)

*Office Hours*: In my office, office space outside my office, or via TEAMs

Monday: 1:00 p.m. – 2:30 p.m.; Tuesday: 3:30 – 4:30;

Thursday: 12:30 p.m. – 2:00 p.m. and 3:30 p.m.– 4:30 p.m.

(Office hours are subject to change. In case of change, students will be notified via Blackboard.)

You can always contact me via email. I’ll try to get back to you quickly.

# Course Materials

* Textbook
* Statistics software: R/R Studio
* Handouts, project materials, homework (posted on Blackboard)
* For some topics, video lectures posted on Blackboard

**Catalog Description**

This course covers advanced analytical techniques students can use in the modeling and evaluation stages of a data science project. Such techniques may include neural networks, k-means and model-based clustering, association rules, segmentation models, and model voting techniques. This course relies on the foundational structure and methodologies established in Explorations in Data Science (MAT 342). Students will complete a group analysis of a data set and present their findings in a lightning talk. Soft skills such as communication and teamwork are built alongside analytical skills.

**Topics in this course include (time permitting):**

* Review from MAT 342
* Regression modeling
* Logistic regression
* Dimension reduction
* Neural networks
* Hierarchical and k-means clustering
* Association rules
* Segmentation models
* Model voting

**Learning Outcomes**

* Students will review the CRISP-DM structure and use it to complete projects.
* Students will explain why dimension reduction is important and will execute principal components analysis to obtaining stable modeling results.
* Students will implement neural networks techniques, discuss why the algorithm is named 'neural networks,' and identify potential downsides of using the black-box algorithm.
* Students will recognize the difference between classification and clustering methodologies, implement deterministic and model-based clustering techniques, and evaluate their clustering results.
* Students will perform segmentation modeling based on exploratory data analysis, clustering, or subject matter knowledge to develop more nuanced models.
* Students will leverage model voting techniques to rectify differences between models' results into a single, cohesive result.
* Students will analyze a data set and condense their methods and results into a written report and lightning talk.
* When students get a numeric answer, they will interpret it in a way non-specialists can understand.

**Grading**

Grades will be based on the midterm exam, quizzes, assignments, projects and class attendance. In-class quiz and exam dates will be announced via Blackboard Announcements, which should also appear in your email. The midterm exam may include a take-home portion. A final team project will take the place of a final exam.

# Final Project:

* Students will perform a group final project on a new data set.
* Results will be conveyed in both a written report and a lightning talk. (Depending on how far we get, you may be required to create a poster presentation that could be submitted to CREATE.) One report will be submitted by the team.
* Lightning talks must be a maximum of four slides long (PowerPoint or Latex), excluding the title slide and citation / acknowledgement slides. Oral presentation of the lightning talk should be around five minutes long.
* In addition, you will submit a reflection paper and complete a rating form for team members participation in the final project.
* Skills assessed include:
  + *Analytic* material mastery.
  + *Teamwork* through group analysis, report writing, and presentation creation.
  + *Written communication* through report writing.
  + *Oral communication* through lightning talk presentation, including accessibility of presented information for non-specialists.

Here is a breakdown of points:

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| --- | --- |
|  | Points |
| Midterm | 100 |
| Projects (including final project) | 200 |
| Assignments, Quizzes, Homework | 130 |
| Attendance | 20 |
| **Total Points** | **450** |

**Keep in mind the following:**

* **DO NOT COME TO CLASS IF YOU ARE SICK!** If you are working on a group project and cannot come to class because you are sick, let your group know that you will not be in class. If you are well enough to work but can’t be in class (possibly you are in quarantine or isolation), you may be able to work with your group via TEAMS during class time. Just let me and your group members know of your situation, and we will see what we can work out.
* I do not expect to give make-ups for the midterm exam.If you *must* miss the midterm, get a message to me *prior* to the exam (e-mail is best).
* For the midterm exam, you may prepare and bring to the exam one page of notes. I may also allow some support for R code.
* Except under rare circumstances, there will be no make-ups for in-class quizzes. Some quizzes will be take-homes quizzes (or graded assignments) and must be turned in on time to get full credit. Your lowest quiz grade will be dropped.

**Cell phones/off-task use of computers**:Attendance in class means that you arrive on time and are fully participating in class, giving class your complete attention. Class time will be divided between lectures, work on assignments, and projects. Some lectures may be assigned to be completed virtually, outside of class (Panopto Lectures posted in Blackboard) to permit longer time for project/assignment work during class. Unless you need to keep your cell phone on for emergencies (for example, you have a child in daycare or a sick parent), *turn off/silence* your phone. **Refrain from texting, responding to e-mail, checking social media or other non-class related activities during class time. Failure to do so can adversely affect your grade.**

# Other Useful Information

Mask Wearing During COVID-19 Pandemic: Maintaining a safe and healthy campus is only possible if every member of the campus community follows the rules. Therefore, Eastern is requiring that all students and faculty wear a face mask **that fully covers the nose and mouth** whenever they are in a classroom or classroom building**.** Face shields can only be worn with an appropriate face mask. Any student who does not comply will be asked to leave class and will not be given credit for attendance. In addition, the student may be referred to the Office of Student Conduct. **We all want to say healthy this semester!**

Blackboard Announcements: **Check Blackboard announcements before coming to class.** Here are some possible types of announcements: on-ground class cancellations, changes in exam and/or quiz dates, office hour changes, hints (for example, on exams, quizzes, assignments, projects), edits to handouts or assignments, clarifications, reminders.

Snow Days/ Cancellation of On-Ground Classes: If on-ground class is cancelled due to weather or other reasons (I’m sick, my car broke down, roads are closed, etc.), check Blackboard for the day’s assignment. You will still have class that day even though you will not be in the classroom!

Disability Statement:  If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact the Office of AccessAbility Services at (860) 465-5573. To avoid any delay in the receipt of accommodations, you should contact the Office of AccessAbility Services as soon as possible. Please understand that I cannot provide accommodations based upon disability until I have received an accommodation letter from the Office of AccessAbility Services. Your cooperation is appreciated.

Intellectual Integrity: Violations of academic integrity will be penalized in one of the following ways; repeating assignment, failing grade on assignment, failing grade in course, and/or student meeting with Department Chair/Assistant Chair. Serious violations will be forwarded to the Judicial Board. Please read Eastern's Academic Misconduct Policy: <https://easternct.makekb.com/entry/307/>.